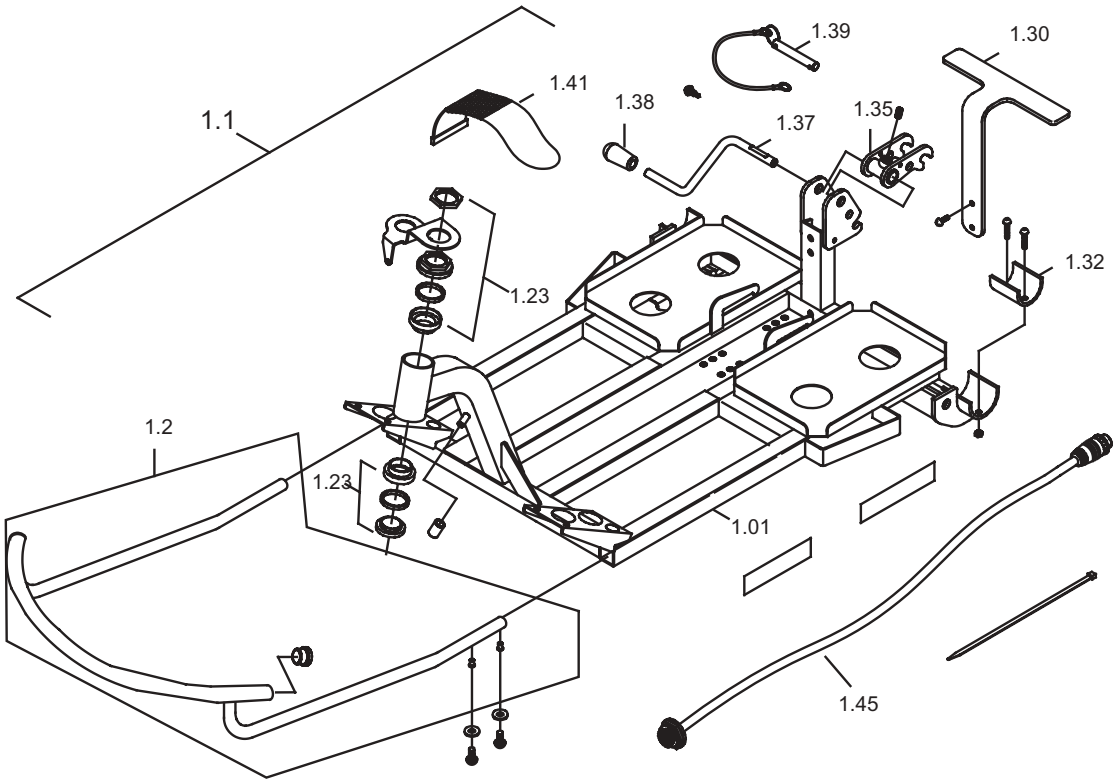
9 Maintenance and repair

9.1. Chassis

9.1.1 Front wheel frame (3-wheeler)

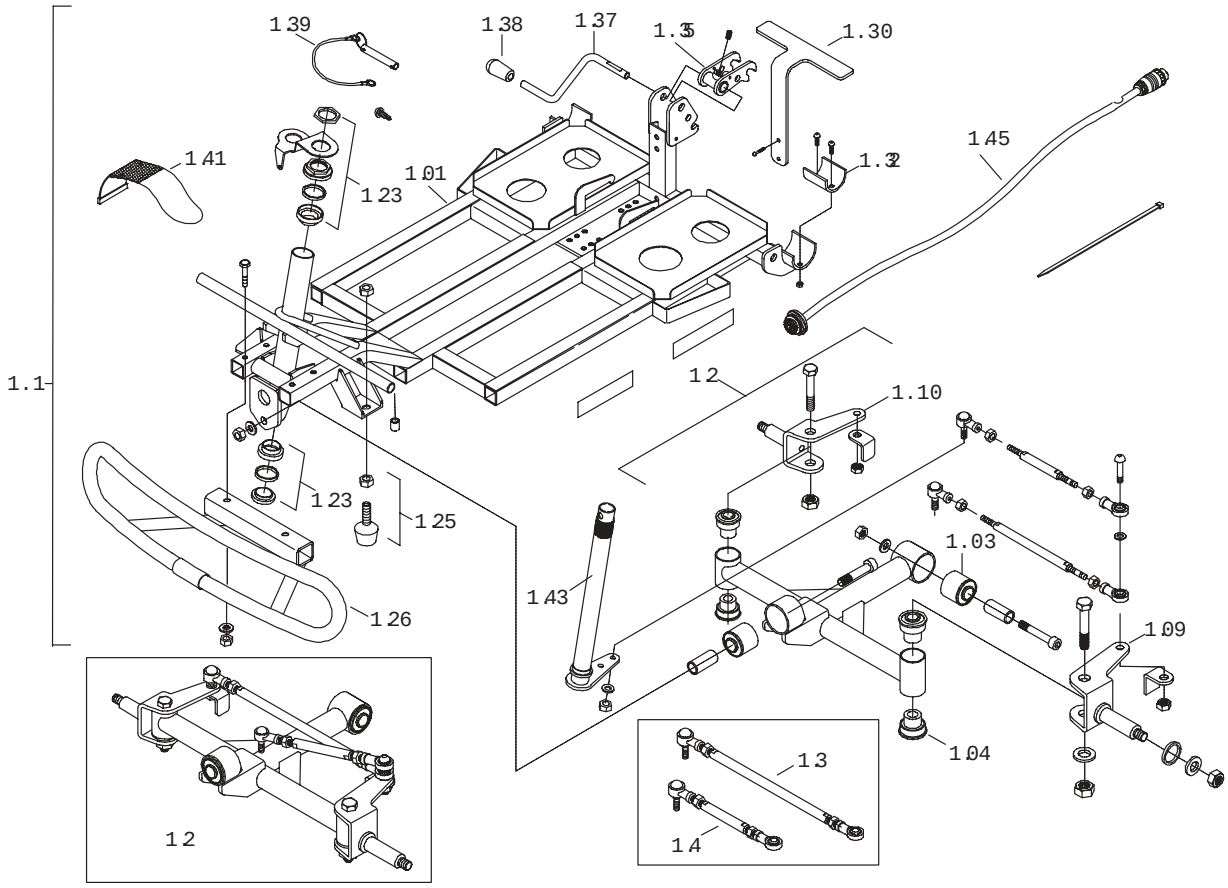
✓ Note:

When servicing the chassis, if deformations or faulty welding seams are found, then the complete chassis should be replaced.



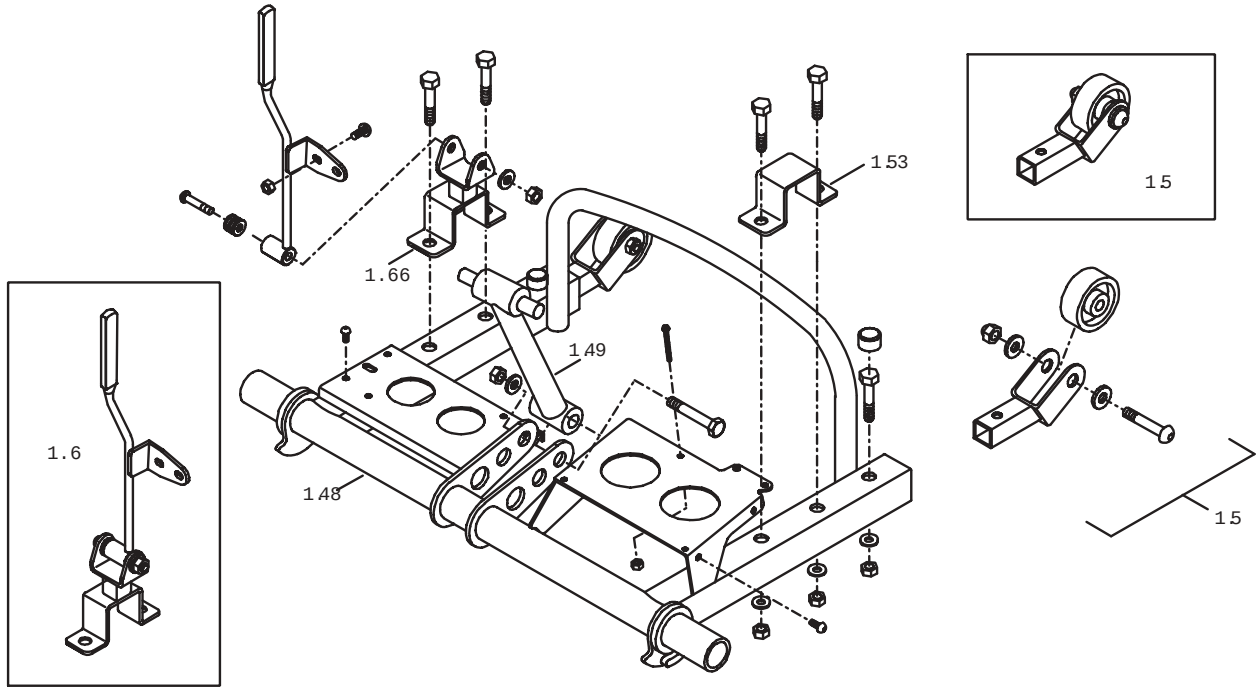
Pos	Qty	Part-No.	Part Description
1,1	1	1421011	FRONT FRAME ASSY., (3 WHEELER)
1,01	1	1421012	FRONT FRAME, (3 WHEELER)
1,2	1	1421013	FRONT BUMPER ASS'Y.,3W
1,23	1	1421014	FORK BEARING SET, 8 PCS/SET
1,30	1	1421015	SUPPORTING BRACKET, REAR SHROUD
1,32	2	1421016	SPACER, FRONT FRAME AND REAR FRAME ASSEMBLY
1,35	1	1421017	ASSEMBLY HOOK, FRAME, 3W/4W
1,37	1	1421019	ASSEMBLY LEVER, FRAME
1,38	1	1421020	BLACK TIP
1,39	1	1421024	PIN WITH TIE, RD. 8x50L
1,41	2	1421027	BATTERY STRAP, 50x660L
1,45	1	1421029	MAIN LOOM, FRAME, 3W/4W

9.1.2 Front wheel frame (4-wheeler)



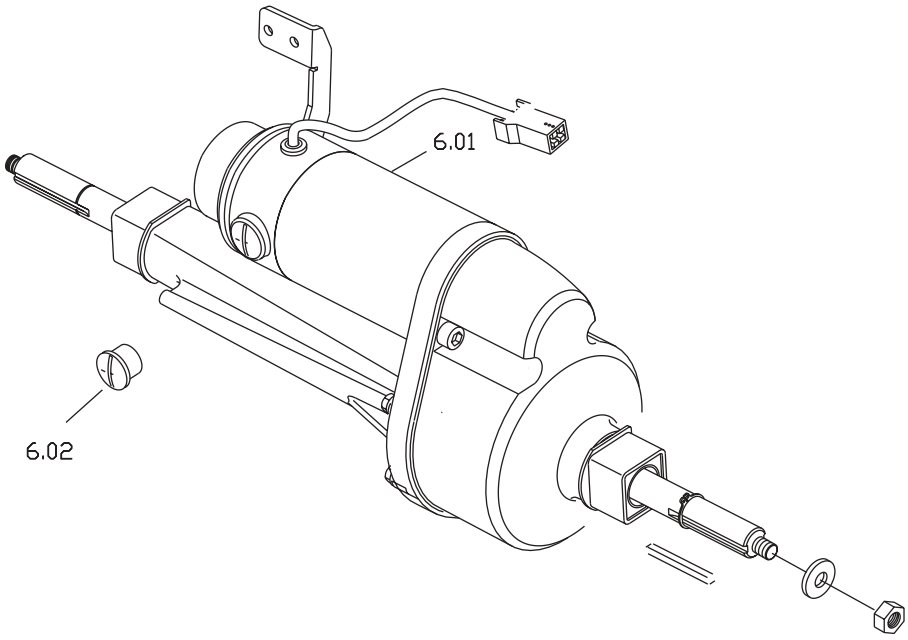
Pos	Qty	Part-No.	Part Description
1,1	1	1421031	FRONT FRAME ASS'Y.,(4 WHEELER)
1,01	1	1421030	FRONT FRAME ONLY, 4W
1,2	1	1421032	FRONT SUSPENSION SYSTEM, 4W
1,03	2	1421033	BUFFER, RUBBER BUSHING
1,04	4	1421034	BALL BEARING, STEM
1,09	1	1421035	FRONT AXLE SET, LH
1,10	1	1421036	FRONT AXLE SET, RH
1,3	1	1421037	CONNECTING ROD SET, LONG RD. 10 X 350 L
1,4	1	1421038	CONNECTING ROD SET, RD. 10 X 150 L, SHORT
1,23	1	1421014	FORK BEARING SET, 8 PCS/SET
1,25	2	1421040	BUFFER, RUBBER BLOCK, M10 X 30 L
1,26	1	1421241	FRONT BUMPER, 4W
1,30	1	1421015	SUPPORTING BRACKET, REAR SHROUD
1,32	2	1421016	SPACER, FRONT FRAME AND REAR FRAME ASSY
1,35	1	1421017	ASSEMBLY HOOK, FRAME, 3W/4W
1,37	1	1421019	ASSEMBLY LEVER, FRAME
1,38	1	1421020	BLACK TIP
1,39	1	1421024	PIN WITH TIE, RD. 8 X 50 L
1,41	2	1421027	BATTERY STRAP, 50 X 660 L
1,43	1	1421249	STEERING PEDESTAL ASS'Y.
1,45	1	1421029	MAIN LOOM, FRAME, 3W/4W

9.1.3 Rear frame assembly (3+4-wheelers)



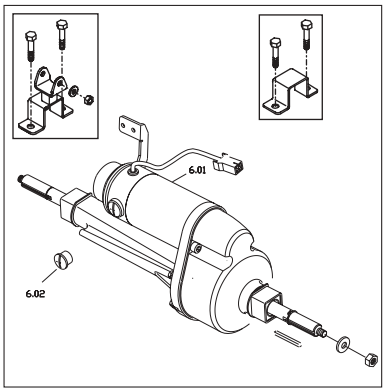
Pos	Qty	Part-No.	Part Description
1,48	1	1421251	REAR FRAME ONLY, 3W/4W
1,49	1	1426314	SHOCK ABSORBERS
1,53	1	1421253	MOUNTING CLAMP, TRANSAXLE
1,5	2	1421254	ANTI-TIPPER WHEEL ASS'Y
1,6	1	1421255	RELEASE LEVER ASS'Y., TRANSAXLE, 3W/4W
1,66	1	1421256	MOUNTING BASE

9.2 Drive Unit



Pos	Qty	Part-No.	Part Description
6,01	1	1416109	TRANSAXLE ASS'Y., M33D
6,02	2	1421275	CARBON BRUSH

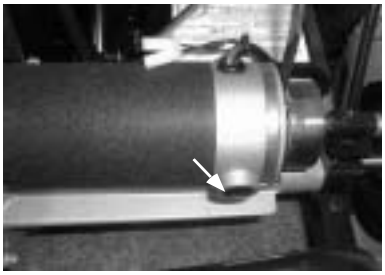
9.2.1 Replacing the drive unit



- Remove the seat and the rear shroud (see chapter 9.3.5).
- Pull the de-clutching lever and jack up the vehicle.
- Remove the screw that connects the release lever to the drive unit.
- Loosen the bolts that hold the wheels and remove them, if necessary using a special tool to remove wheels (see notes on page 24).
- Release the clamps that hold the drive unit.
- Disconnect the cable that connects the drive unit and the electronic system, and remove the drive unit.

Reassembly is done in reverse order.

9.2.2 Replacing the carbon brushes

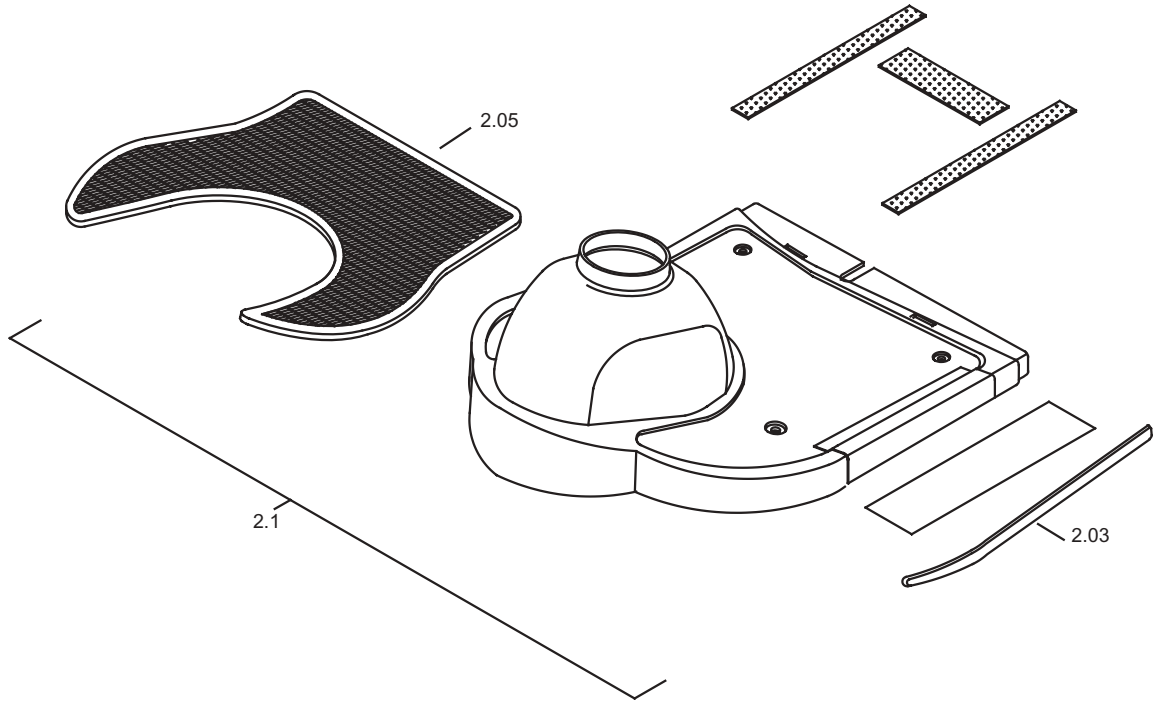


- Remove the seat and the rear shroud (see chapter 9.3.5).
- Remove the spray guard of the charger.
- Remove all four screws on the charger and remove the charger.
- Remove both plastic screws from the drive unit and replace the brushes.

Reassembly is done in reverse order.

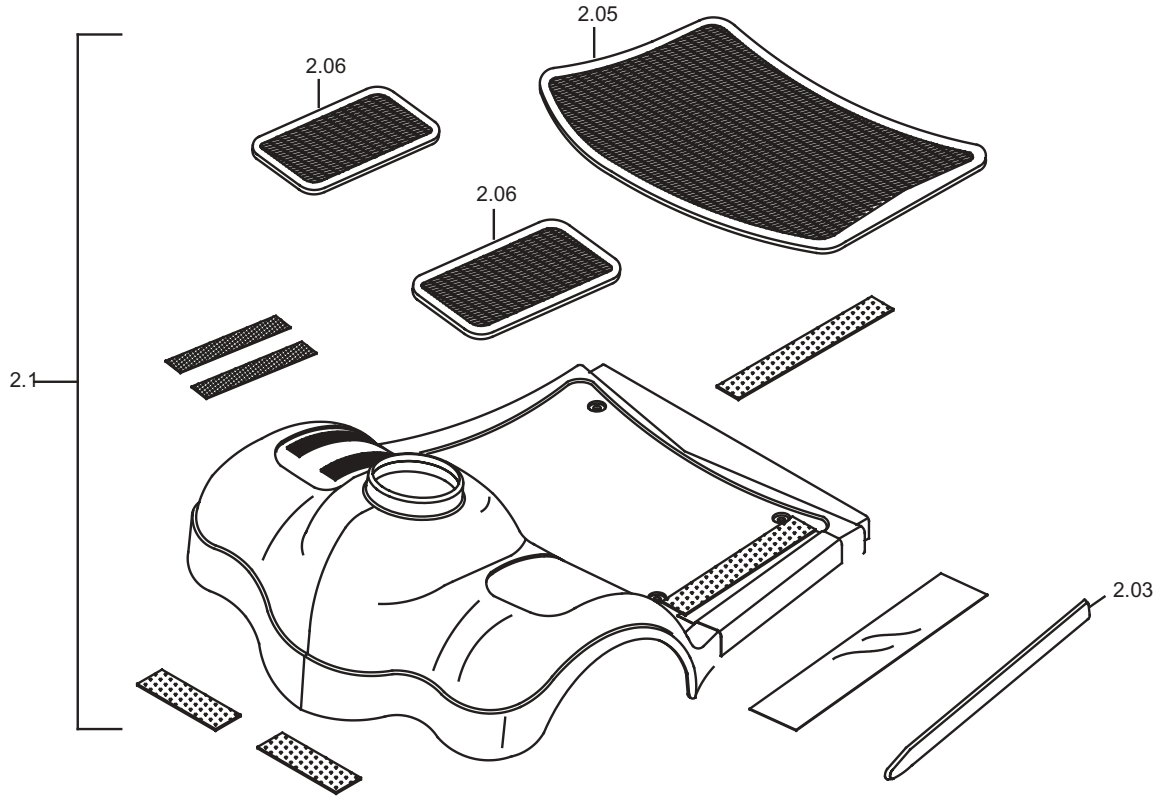
9.3 Shroud

9.3.1 Front shroud (3-wheeler)



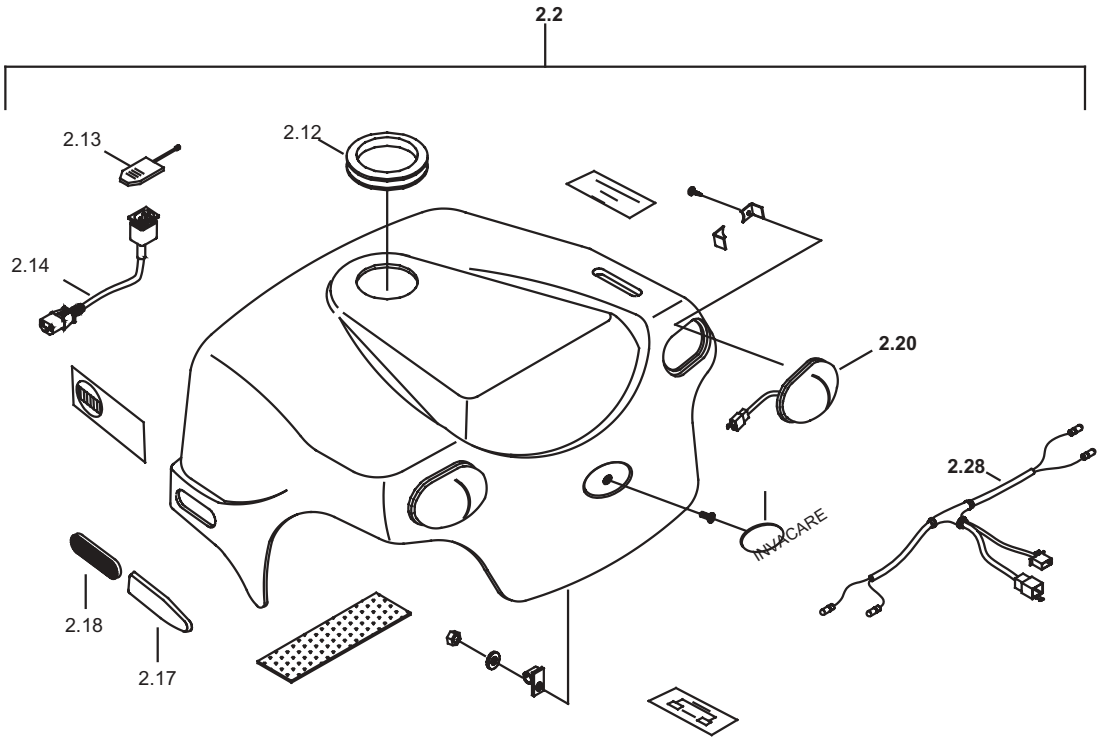
Pos	Qty	Part-No.	Part Description
2,1	1	1421257	FRONT SHROUD ASS'Y., RUBY RED, 3W
2,1	1	1421258	FRONT SHROUD ASS'Y., SAPPHIRE BLUE, 3W
2,03	2	1421259	SIDE TRIM, 16 X 640 L
2,05	1	1421260	CARPET, GREY, 3W

9.3.2 Front shroud (4-wheeler)



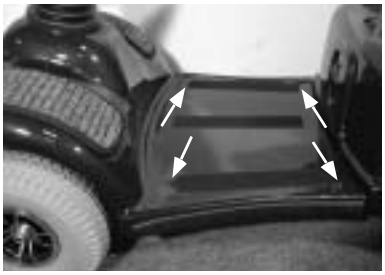
Pos	Qty	Part-No.	Part Description
2,1	1	1421261	FRONT SHROUD ASS'Y., RUBY RED, 4W
2,1	1	1421262	FRONT SHROUD ASS'Y., SAPPHIRE BLUE, 4W
2,03	2	1421263	SIDE BUMPER, 25 X 380 L
2,05	1	1421264	MAIN CARPET, GREY, 4W
2,06	2	1421265	SMALL CARPET, GREY, 4W

9.3.3 Rear shroud (3+4-wheelers)



Pos	Qty	Part-No.	Part Description
2,2	1	1421266	REAR SHROUD ASS'Y.,RUBY RED, 3W/4W
2,2	1	1421267	REAR SHROUD ASS'Y.,SAPPHIRE BLUE, 3W/4W
2,12	1	1421268	RUBBER BOOT, SEAT POST
2,13	1	1421269	CAP, CHARGER SOCKET
2,14	1	1421270	WIRE OF CHARGER PLUG
2,17	2	1421271	SIDE RUBBER PAD, 25 X 125 L
2,18	2	1421272	REFLECTOR, YELLOW
2,20	2	1421273	REAR LAMP / LH
2,21	1	1426324	REAR LAMP / RH
2,28	1	1421274	TAIL/INDICATOR LIGHT CONNECTING WIRE

9.3.4 Removing and re-fitting the front shroud (3+4-wheelers)



- Remove the seat and the rear shroud (see chapter 9.3.5).
- Tilt the steering column towards the rear.
- Roll up the rubber sleeve.
- Loosen and remove the clamping lever, and disconnect the cable.
- Remove the steering column by turning and pulling it upwards.
- Remove all four screws under the foot mat.
- Carefully detach the front shroud from the velcro strips, and remove by pulling upwards.

Reassembly is done in reverse order.

9.3.5 Removing and re-fitting the rear shroud

Note:

When removing the rear shroud, first detach the velcro fasteners on the sides, then pull the shroud up and off. When re-fitting the shroud, first position both of the openings for the seat post and the de-clutching lever. Then fit the two tabs on the front of the shroud into the corresponding slots, push the shroud down, and firmly press the velcro fasteners together.

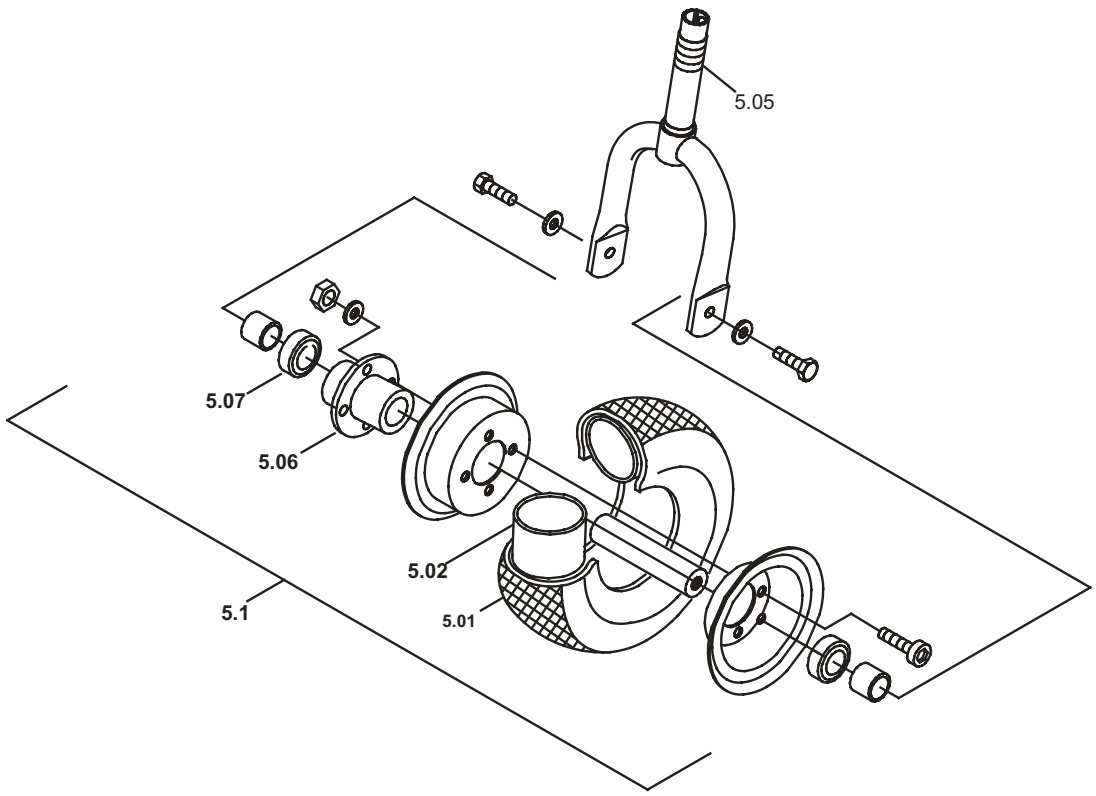
- Pull the lever that releases the seat.
- Rotate the seat a quarter of a revolution in either direction and remove the seat.
- Carefully release the rear shroud from the velcro fasteners.
- Disconnect the cables that go to the lighting system and the on-board charger, and remove the rear shroud.

Reassembly is done in reverse order.

9.4. Wheels

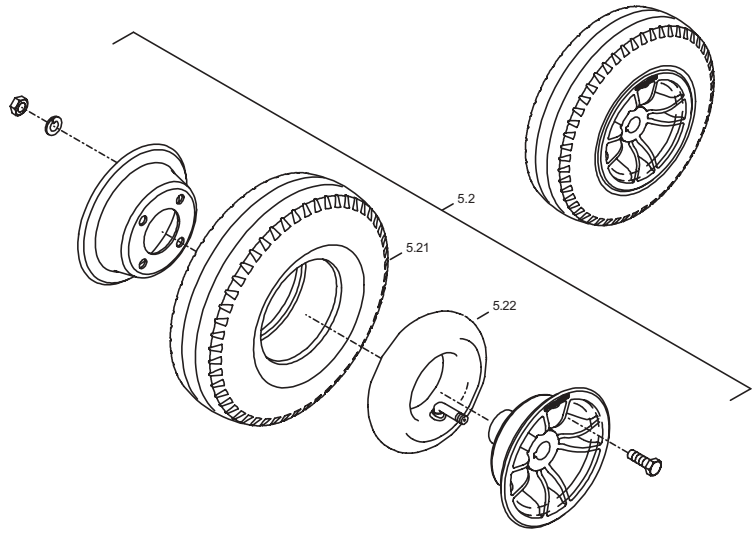
✓ Note:
When replacing worn or damaged wheels and / or tyres, you may need to use special tools, such as a wheel removal tool, or let the work be performed by an authorised dealer.

9.4.1 Front wheel assembly (3-wheeler)



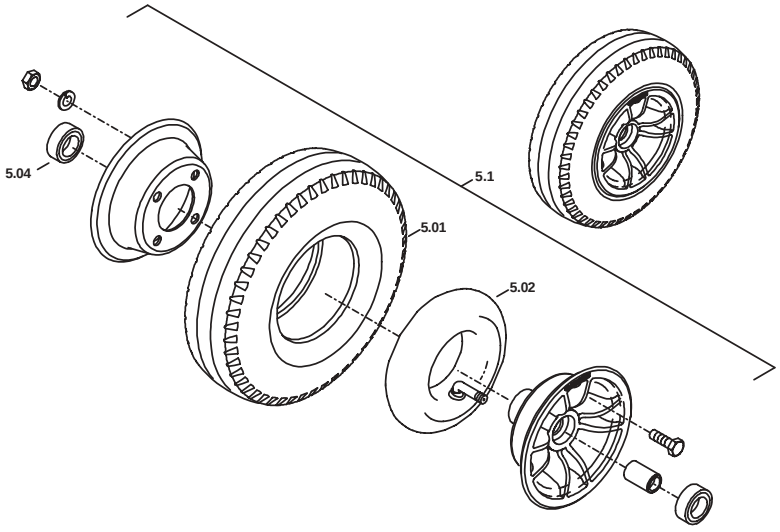
Pos	Qty	Part-No.	Part Description
5,1	1	1421276	FRONT WHEEL ASS'Y., 3.00-4 (260 X 85)
5,01	1	1421277	TYRE, 3.00-4
5,02	1	1421278	INNER TUBE, 3.00-4
5,05	1	1421279	FORK, 10" WHEEL
5,06	1	1421280	HUB, FRONT WHEEL
5,07	2	1421281	PRECISION BEARING, 6003 ZZ

9.4.2 Front wheel assembly (4-wheeler)



Pos	Qty	Part-No.	Part Description
5,2	2	1421284	REAR WHEEL ASS'Y., 3.00-4, W/INVACARE LOGO
5,21	1	1421277	TYRE, 3.00-4
5,22	1	1421283	INNER TUBE ONLY, 3.00-4

9.4.3 Rear wheel assembly (3+4-wheelers)



Pos	Qty	Part-No.	Part Description
5,1	2	1421282	FRONT WHEEL ASS'Y., 3.00-4, W/INVACARE LOGO
5,01	1	1421277	TYRE, 3.00-4
5,02	1	1421283	INNER TUBE ONLY, 3.00-4
5,04	2	1421281	PRECISION BEARING, 6003 ZZ

Caution:

Either jack up the vehicle, and use appropriate supports (such as blocks of wood) to prop it up, or tilt it over on its side. Make sure the front wheel(s) can revolve freely. Secure the vehicle against sliding or falling over. **Danger of injury!**

9.5 Assembling / disassembling the front wheel (3-wheeler)

- Pull the de-clutching lever, jack up the vehicle, and remove both bolts, which hold the wheel.
- Remove the wheel from the fork.

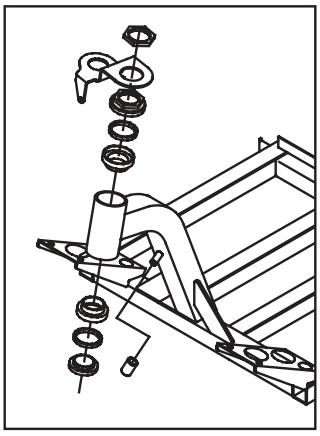
Reassembly is done in reverse order.

9.5.1 Assembling / disassembling the front fork (3-wheeler)

- Remove the seat and the rear shroud (see chapter 9.3.5).
- Remove the steering column (see chapter 9.3.4).
- Remove front shroud (see chapter 9.3.4).
- Remove the eight-sided nut, the metal Gusset, and the second eight-sided nut underneath it.
- Lift the crash guard and pull the fork down and out.

Reassembly is done in reverse order.

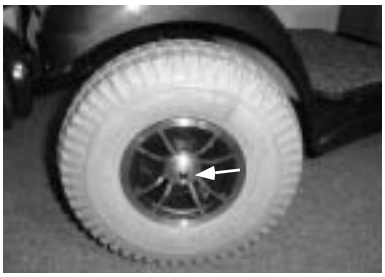
9.5.2 Replacing the bearings (3-wheeler)



- Remove the seat and the rear shroud (see chapter 9.3.5).
- Remove the steering column (see chapter 9.3.4).
- Remove the front shroud (see chapter 9.3.4).
- Remove the eight-sided nut, the metal Gusset, and the second eight-sided nut underneath it.
- Lift the crash guard and pull the fork down and out.
- Pull the fork down and out, and replace the bearings.

Reassembly is done in reverse order.

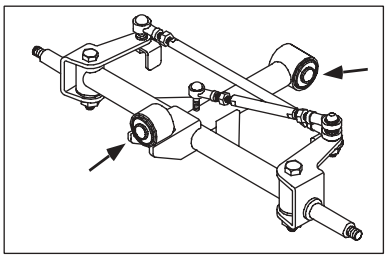
9.6 Assembling / disassembling the front wheel (4-wheeler)



- Pull the de-clutching lever and jack up the vehicle.
- Remove the nut and the washer underneath it, and remove the front wheel.

Reassembly is done in reverse order.

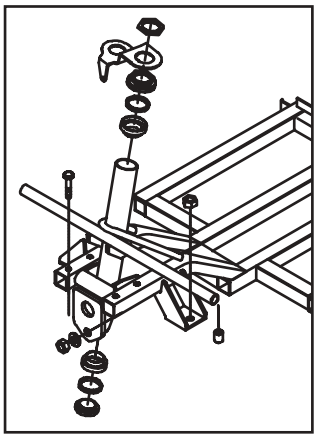
9.6.1 Assembling / disassembling the front suspension (4-wheeler)



- Remove the seat and the rear shroud (see chapter 9.3.5).
- Remove the steering column and the front shroud (see Chapter 9.3.4).
- Pull the de-clutching lever and jack up the vehicle.
- Remove the Allen screws and the nuts of the front wheel suspension from the chassis.
- Pull the front wheel suspension out towards the front.
- Remove both steering rods from the front wheel suspension.
- Remove the front wheel (see above).

Reassembly is done in reverse order.

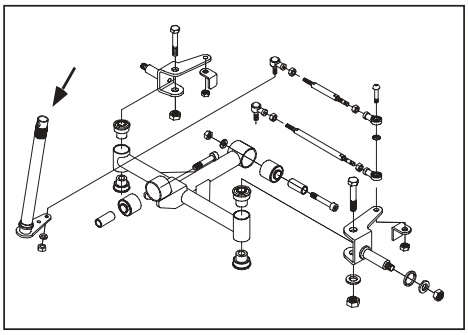
9.6.2 Replacing the bearings (4-wheeler)



- Remove the seat and the rear shroud (see chapter 9.3.5).
- Remove the steering column and the front shroud (see Chapter 9.3.4).
- Pull the de-clutching lever and jack up the vehicle.
- Remove the Allen screws and the nuts of the front wheel suspension from the chassis.
- Pull the front wheel suspension out towards the front.
- Remove the connecting nut and gusset
- Pull the fork down and out, and replace the bearings.

Reassembly is done in reverse order.

9.6.3 Assembling / disassembling the steering column tube (4-wheeler)



- Remove the seat and the rear shroud (see chapter 9.3.5).
- Remove the steering column and the front shroud (see Chapter 9.3.4).
- Pull the de-clutching lever and jack up the vehicle.
- Remove the Allen screws and the nuts of the front wheel suspension from the chassis.
- Pull the front wheel suspension out towards the front.
- Remove the connecting nut and gusset
- Remove the steering column tube from the steering rods.

Reassembly is done in reverse order.

9.6.4 Assembling / disassembling the rear wheels (3+4-wheelers)

- Pull the de-clutching lever and jack up the vehicle.
- Remove the nut in the centre of the wheel, and pull off the rear wheel, you may need to use a special wheel removal tool (see notes on p.24).

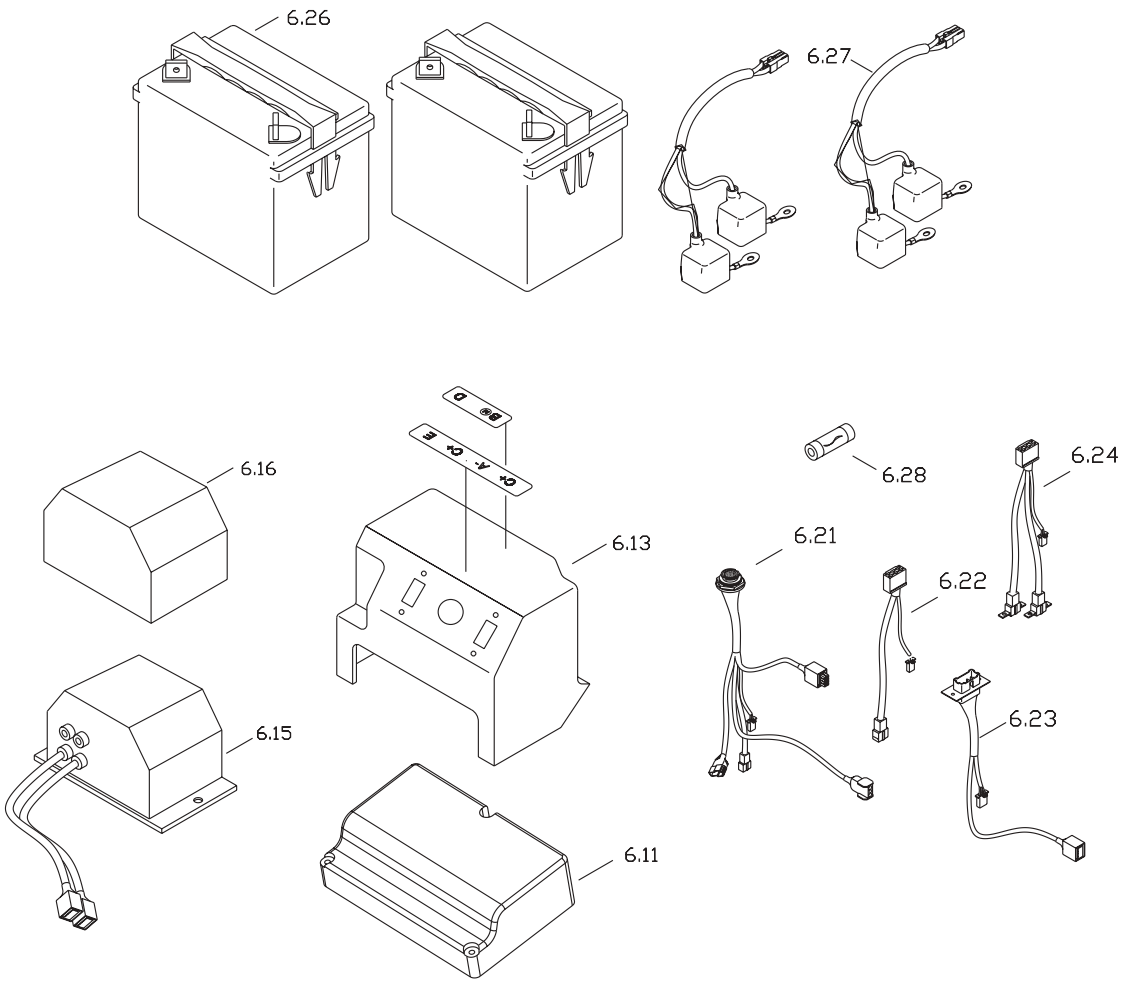
Reassembly is done in reverse order.

9.7. Electronic system

Caution:

Be careful not to short-circuit the battery poles with a tool!
Take into account the heavy weight of the batteries!
Danger of injury!

9.7.1 Batteries, electronic system, charger and connections



POS	Qty	Part-No.	Part Description
6,11	1	1421606	CONTROLLER, RHINO DS72K01
6,13	1	1421607	ELECTRONIC COVER
6,15	1	1421608	CHARGER, ON-BOARD, HAMPTON 24V/3A OB7
6,16	1	1421609	WATERPROOF COVER
6,21	1	1421610	MAIN LOOM, CONTROLLER
6,22	1	1421611	WIRE CONNECTING, MOTOR/CONTROLLER
6,23	1	1421612	CONNECTING WIRE, POWER SEAT
6,24	1	1421613	WIRE CONNECTING, CONTROLLER
6,26	2	P50029	BATTERY 12V / 31 AH
6,26	2	PG50988	BATTERY MK 12V / 40 AH
6,27	2	1421614	WIRE CONNECTING WITH 40A FUSE, BATTERY
6,28	2	1421615	FUSE, 60A

9.7.2 Replacing the charger

- Remove the seat and the rear shroud (see chapter 9.3.5).
- Disconnect the cable that goes from the electronics to the charger, and remove the charger spray guard.
- Remove all four screws and the charger.

Reassembly is done in reverse order.

Note:

Make sure that both batteries are charged (24V), if necessary, charge them completely. Check the charge levels of both batteries individually!

9.7.3 Replacing the batteries

- Remove the seat and the rear shroud (see chapter 9.3.5).
- Remove the battery cable (C) from the electronics.
- Open the belts that hold the batteries and remove the batteries.
- Disconnect the battery cable contacts from the batteries.
- After replacing with new or charged batteries, re-connect the contacts of the battery cables to the batteries.
  Make sure to connect the cables to the correct poles!

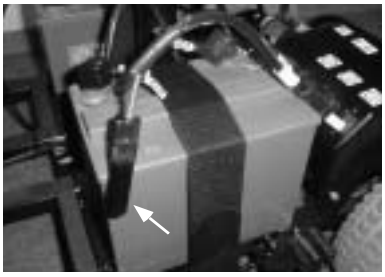
Reassembly is done in reverse order.

9.7.4 Replacing the electronics

- Remove the seat and the rear shroud (see chapter 9.3.5).
- Remove the battery cables (C), the main cable loom (A) of the steering column, and the drive unit cable (B) from the electronic system
- Remove all four screws from the charger shroud.
- Remove the 8, 6 and 4 pronged plugs from the electronic system.
- Remove the electronics box (see above).
- Remove all three screws and take out the electronics.

Reassembly is done in reverse order.

9.7.5 Replacing a fuse



- Remove the seat and the rear shroud (see chapter 9.3.5).
- Open the fuse holder on the battery cable and replace the fuse.

Reassembly is done in reverse order.

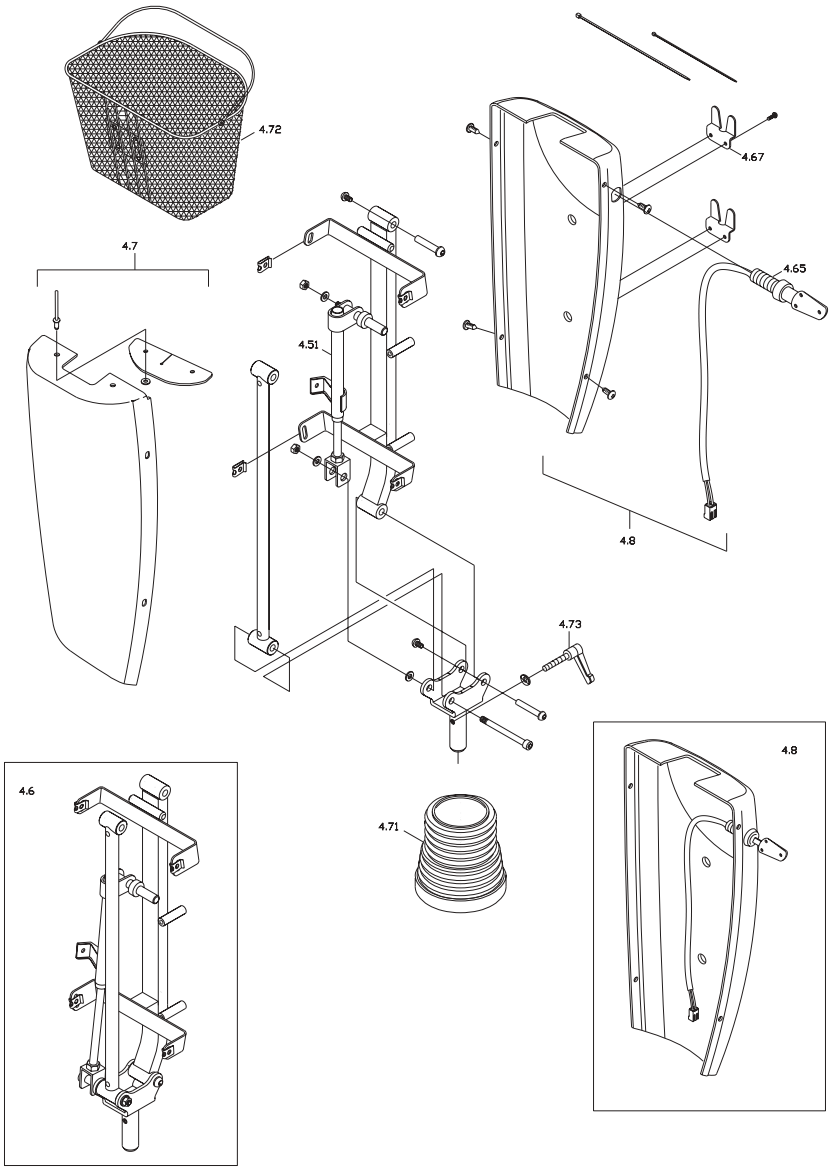
9.7.6 Hand-held programmer

- The hand-held programmer serves to diagnose faults, and to adjust driving parameters.
- The set consists of the hand-held programmer and an adapter cable.
- For more information on programming and fault diagnosis, please use the hand-held programmer's User Guide.

Part # 1421661

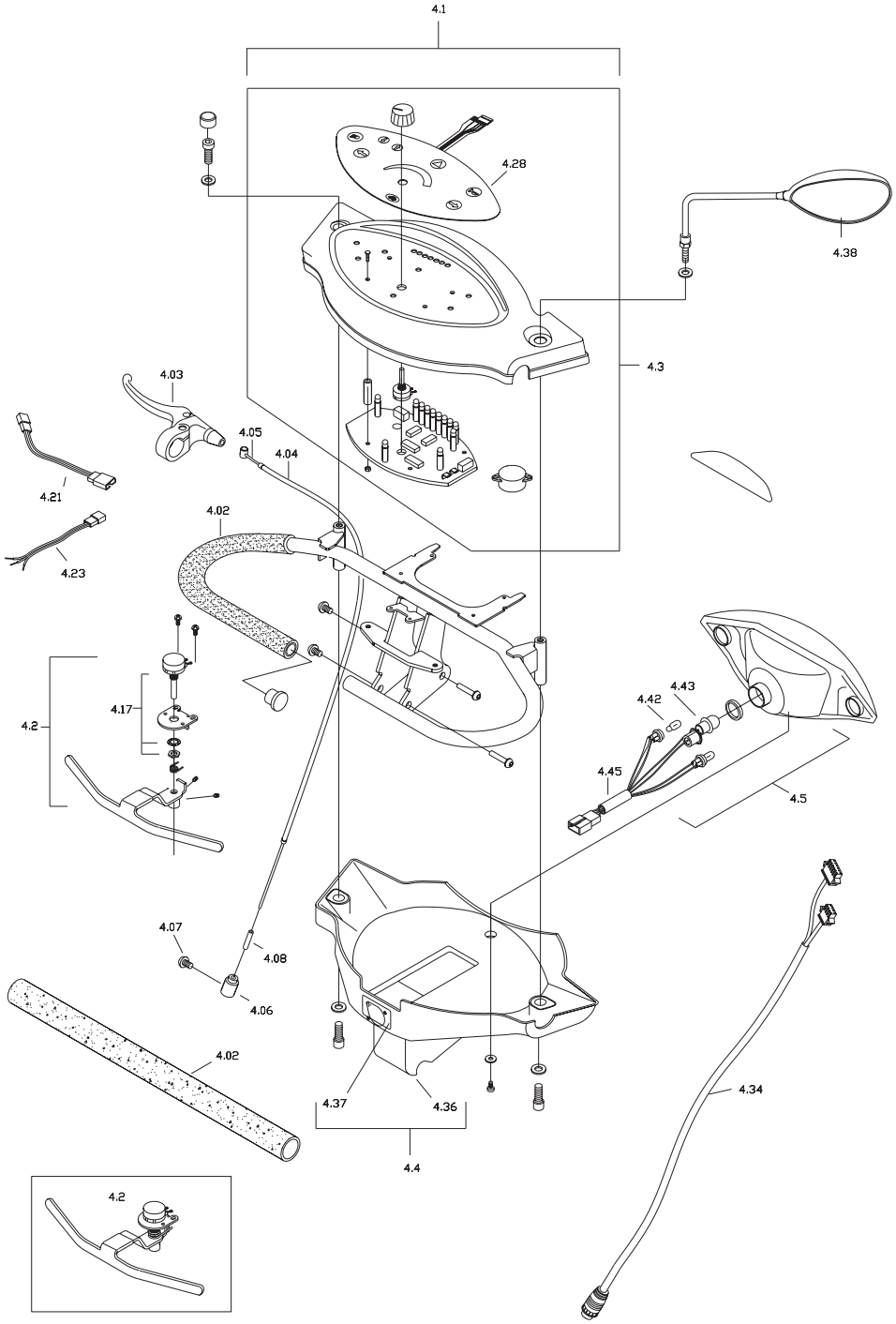
9.8 Tiller linking assembly / control panel

9.8.1 Steering column



Pos	Qty	Part-No.	Part Description
4,6	1	1421039	TILLER LINKING MECH. ASS'Y., 3W/840
4,51	1	1421242	HEIGHT ADJ. LOCK MECH., 230L
4,7	1	1421243	REAR TILLER SHROUD SET, CANDY APPLE RED, 3W/4W
4,7	1	1421244	REAR TILLER SHROUD SET, BLUE, 3W/4W
4,8	1	1421245	FRONT TILLER SHROUD SET, CANDY APPLE RED, 3W/4W
4,8	1	1421246	FRONT TILLER SHROUD SET, BLUE, 3W/4W
4,65	1	1421247	KEY SWITCH W/CONNECTING WIRE, 3W/4W
4,67	2	1421248	MOUNTING BASKET SPCC 2.5 T
4,71	1	1421250	LOWER RUBBER BOOT
4,72	1	1421616	BASKET, WIRE MESH
4,73	1	1426337	SET COLLAR

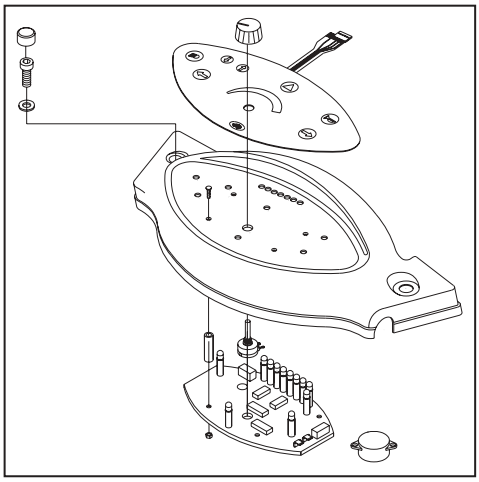
9.8.2 Tiller



Pos	Qty	Part-No.	Part Description
4.1	*1*	*1421619*	**TILLER ASS'Y RED, 3W/4W**
4,1	1	1421619	TILLER ASS'Y., BLUE, 3W/4W
4,02	2	1421620	FOAM SLEEVE, RD. 30 X 20 X 355 L
4,03	1	1421621	LEVER BRAKE, LH
4,04	1	1421622	CABLE CASING, 450L, LONG
4,05	1	1421623	WIRE, RD. 1.5 X 540 L
4,06	1	1421624	STOPPER

Pos.	Qty	Part-No.	Part Description
4,07	1	1421625	SCREW, M5 X 8 L
4,08	1	1421626	ALUM. WIRE END CAP
4,2	1	1421627	THROTTLE ASS'Y., 3W/4W
4,17	1	1421628	POTENTIOMETER
4,21	1	1421629	CONNECTING WIRE, POT
4,23	1	1421630	CONNECTING WIRE, SPEED POT
4,3	1	1421631	UPPER DASH BOARD SET, CANDY APPLE RED, 3W/4W
4,3	1	1421632	UPPER DASH BOARD SET, BLUE, 3W/4W
4,28	1	1421633	TOUCH PANEL, KEYPAD, 3W/4W
4,34	1	1421634	MAIN LOOM, TILLER, 3W
4,4	1	1421635	LOWER DASH BOARD SET, CANDY APPLE RED, 3W/4W
4,4	1	1421636	LOWER DASH BOARD SET, BLUE, 3W/4W
4,37	1	1421637	CHARGER SOCKET WITH WIRE
4,38	1	1421638	BACK MIRROR, RH
4,38	1	1421639	BACK MIRROR, LH
4,5	1	1421640	HEAD LIGHT WITH WIRE ASS'Y.
4,42	2	1421641	BULB, 24V/5W, INDICATOR LIGHT
4,43	1	1421642	BULB, 24V/18W
4,45	1	1421643	CONNECTING WIRE, HEAD LIGHT

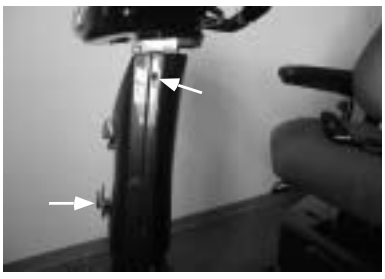
9.9 Replacing the keypad and the control panel



- Remove the plastic caps from the screws on the left and right sides on top of the control panel, remove the screws, and disconnect the circuit board.
- Remove the control panel.
- Remove the cap from the knob and remove the knob.
- Remove the control circuit board and disconnect and remove the keypad.
- Lift the 2-ply keypad on one corner with a flat tool and pull it off.
- Remove any remnants of adhesive left over after removing the foil.

Reassembly is done in reverse order.

9.9.1 Assembling / disassembling the steering column shroud



- Remove the screws that hold the basket.
- Remove the screws from the steering column shroud.
- Remove the control panel (see above).
- Disconnect the key switch with its cable from the control circuit board, and remove the shroud.

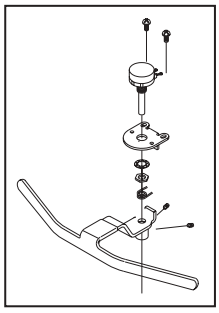
Reassembly is done in reverse order.

9.9.2 Replacing the Bowden cable

- Remove the rear shroud from the steering column.
- Remove the screw at the end of the Bowden cable from the stopper, and pull the Bowden cable out.
- Remove the screw on the steering column completely pull out the Bowden cable.

Reassembly is done in reverse order.

9.9.3 Replacing the throttle lever



- Remove the control panel (see chapter 9.9).
- Remove the screws from the potentiometer.
- Remove the Allen screws on both sides and pull the throttle lever down and out.

Reassembly is done in reverse order.

9.9.4 Replacing the potentiometer

- Remove the control panel (see chapter 9.9)
- Remove the screw from the potentiometer.
- Loosen the Allen screws on the side and pull the potentiometer up and out.
- Remove some of the insulation material from the wires that are connected to the potentiometer, and use a soldering iron to melt the soldered connections.
- Remove the spring, the nut and the washer.
- Fit the new potentiometer and centre it (see notes below).

Reassembly is done in reverse order.

Note:

When fitting a new potentiometer, it is of upmost importance to make sure the potentiometer, as well as the throttle lever are correctly centred. **Danger of accidents!** The potentiometer has a standard value of approximately 5 kOhm. Check the potentiometer with a digital multimeter to make sure that it returns exactly the same value from the right and left connections to the neutral centre position.

9.9.5 Replacing the light bulbs in the front

- Remove the control panel (see chapter 9.9).
- Remove the screw that holds the head light, located underneath the lens (see fig. 9.9.7).
- Tilt the head light upwards and take it out.
- Remove the fixture with the bulb from the rear of the head light by twisting and pulling it out. Replace the bulb.

Reassembly is done in reverse order.

9.9.6 Replacing the light bulbs in the rear

- Remove the seat and the rear shroud (see chapter 9.3.5).
- Remove the light fixture from the inside of the rear shroud by twisting it, and replace the bulb.

Reassembly is done in reverse order.

9.9.7 Replacing the head light

- Remove the control panel (see chapter 9.9).
- Remove the screw that holds the head light, located underneath the lens (see fig. 9.9.7).
- Tilt the head light upwards and take it out. Remove the light fixture from the rear of the head light.

Reassembly is done in reverse order.